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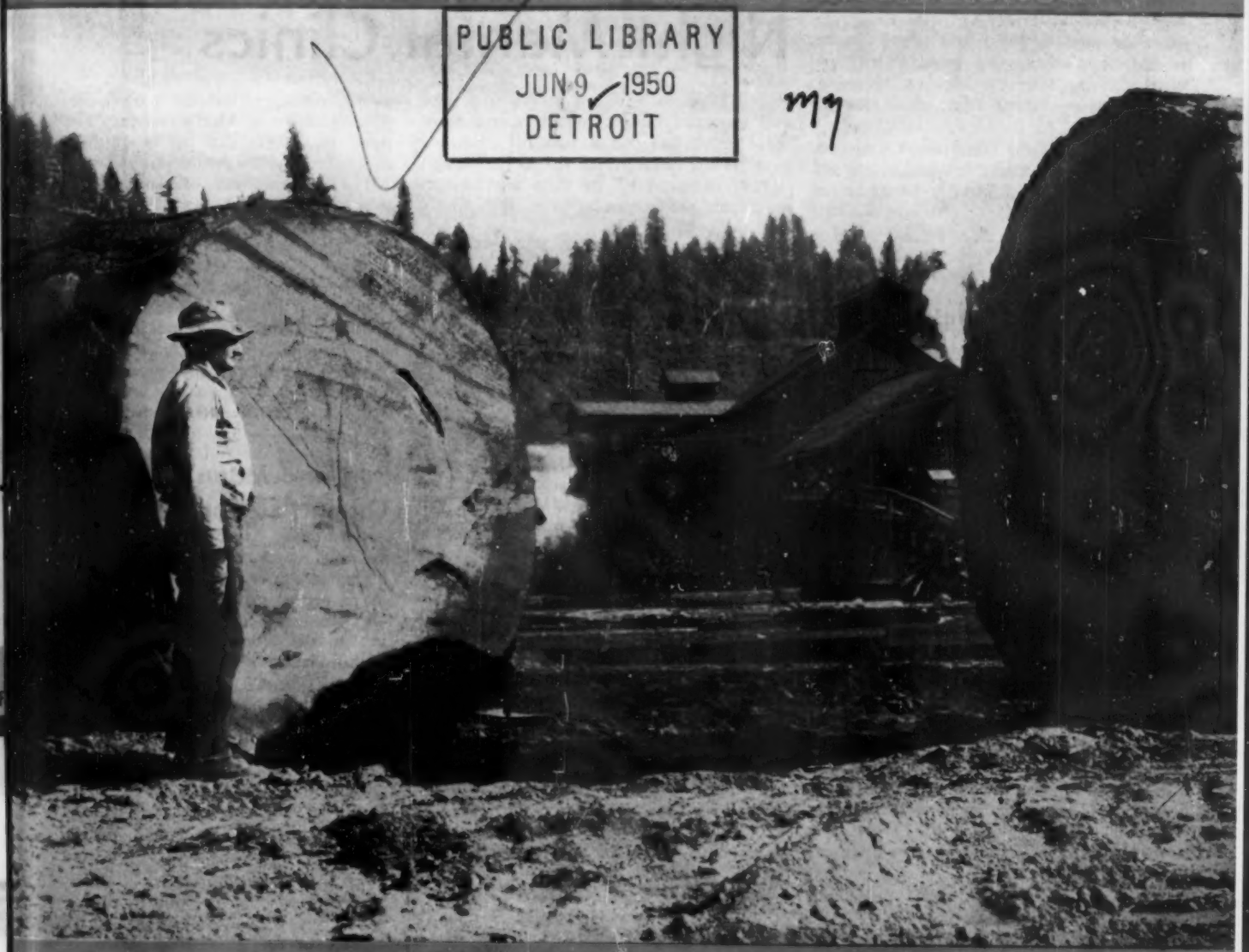
TECHNOLOGY DEPT. JUNE 3, 1950

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



The Peak in Pines

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VOL. 57 NO. 22 PAGES 337-352

NUTRITION

From Now On: Food

Fresher tasting foods and synthetic meals can be produced by science in the future. Radiations are used to increase the vitamin content of food.

By WATSON DAVIS

Tenth in a series of glances forward in science.

➤ TWO generations ago the people of the world, even in the most advanced areas, were dependent mostly upon stored grains for their food supply when winter came; meat freshly killed, or smoked, salted and dried; canning, largely at home; a few dried fruits and vegetables; some cold storage, and sugar.

The woman of the house could not open a few cans, break open a few packages from the deep freeze and quickly have dinner ready.

The variety and quality of food is today very nearly the same the year around, thanks to swift transportation for fresh foods, canning, quick frozen foods, cold storage, hermetically sealed packages and standardized fresh bread and milk.

Vitamins are cherished and extolled in food these days, and added where none are natural. There is appreciation of the quality of protein, now that it is known that there is difference in amino acids. There are many other dimensions than taste and calories to food, although modern nutrition bows often to the natural selection of the gourmet. Paprika's brilliance and fire hid a bountiful supply of vitamin A.

Not content with the marvels of the present food industry, scientific research continues the revolution of our eating.

Radiations of various sorts are entering the food factories. Using ultraviolet radiation to increase the vitamin D content of breakfast food, for instance, is standard. Streams of electrons, called cathode rays, are a new method of sterilizing or reducing concentration of bacteria, yeasts and molds in milk and other foods. This is a new equivalent of pasteurization, but without marked heating of the food. X-rays may prove useful in some cases for a similar purpose.

Areas remote from the sea now have fresh fish and seafood almost the equal of wharf-side restaurants, because of frozen supplies and rapid refrigerated deliveries. But the latest technique is to ship lobsters alive in chemically-adjusted miniature replicas of their ocean environments.

There are tricks in tickling the palate that nature does not know. Monosodium glutamate is a taste enhancer that can be used in almost everything from soup to nuts.

To the large company which collects and processes (contrasted with the yesteryear farmer who grew and ate), the major task is processing, preservation and transportation of foods we shall eat tomorrow, next month and next year.

For the future:

A. Methods of preservation, that may escape from the limitations of heat and cold, can be expected to provide fresher-tasting foods that can be kept longer.

B. New sources for protective foods and vitamins may be in the time-honored foods of other lands.

C. Food in major volume will be synthesized from non-food crops and chemicals, such as edible fats from coal and petroleum, when justified economically.

Science News Letter, June 3, 1950

PSYCHIATRY

Night Mental Clinics

➤ NIGHT clinics where people with jobs and moderate incomes could receive treatment for mental and nervous ills are urged as a "prime requisite for the mental health of any community," by three psychiatrists in private practice in Beverly Hills, Calif., and in Seattle, Wash.

Contrary to popular opinion, it is not just the extremely wealthy, idle, old lady with nothing better to do who goes to the psychiatrist for help, it was found from a study of 100 consecutive patients who went to the offices of Dr. Nathan K. Rickles of Beverly Hills and Drs. J. J. Klein and M. E. Bassan of Seattle.

The great majority were from families with earnings under $5,000 a year, these specialists report in the AMERICAN JOURNAL OF PSYCHIATRY (May). Twelve were professional people, eight unskilled laborers and the other 80 pretty well distributed among other occupational groups—business men, office workers, skilled laborers, and housewives.

A little more than half—54%—were men.

Twelve out of the hundred felt that they had to do without treatment even though they had gone to a psychiatrist for advice. They were prevented either because they could not afford it or because they could not leave their jobs during working hours. It is for patients like these that the doctors recommend night clinics.

But all who continued treatment were able to pay and the mental illness was no more of a financial strain than a physical illness such as a kidney, heart, or gastrointestinal disorder, it was found.

The average expenditure for psychiatric care in the office was $240 per person for a year, and this is consistent with the average expense of any sickness in other medical specialties. In cases where hospitalization was necessary, the average stay was 29 days at a total cost of about $400.

"It is not more expensive to be taken to a hospital with an acute psychotic episode for treatment by electroshock or insulin than it is to go to a hospital with pneumonia, coronary thrombosis or for an appendectomy," the doctors state. "Furthermore, we believe that the expense is fully as justified and the results just as favorable."

The most common complaint which took these patients to the office of the psychiatrist was "nervousness." "I'm nervous," the patient would tell the doctor as his first statement. Behind this nervousness was a feeling of basic insecurity and uneasiness in relation to the environment. The patients were self-conscious and felt that they did not "belong." Several feared that they were "going crazy," and some worried for fear they might harm someone.

Science News Letter, June 3, 1950

PHYSICS

Sun and Moon's Effect On Earth Being Measured

➤ USING an extremely sensitive instrument known as a gravimeter, similar to that used in geological explorations, a University of California at Los Angeles physicist is trying to determine the exact gravitational pull on the earth by the sun and moon.

He is John T. Pettit who hopes to establish definite facts about gravitation, most of which are now only in the theoretical stage.

Since Sir Isaac Newton, he declares, little practical investigation of the fundamental properties of gravity has been done. Most of the work has been theoretical—including Einstein's recently-announced unified field theory.

Mr. Pettit points out that not only are the oceans affected by the pull of the sun and moon, thus causing tides; but that the land surface of the globe is distorted as well. This distortion may be as much as four feet.

To measure the gravitational distortion, Mr. Pettit is using a gravimeter, used in geological exploration. So sensitive is this device that it can measure changes with an accuracy of one part in a billion margin of error.

Science News Letter, June 3, 1950

MEDICINE

Alcohol No Heart Remedy

The past practice of giving alcohol in cases of the heart disease known as angina should be changed. Alcohol does not dilate the heart arteries as once thought.

➤ THE prevalent idea that alcohol is good medicine for patients with heart disease "should be drastically amended," three U. S. Public Health Service researchers declare in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (May 27).

The three are Drs. Henry I. Russek, Charles F. Naegele and Frederic D. Regan of the U. S. Marine Hospital, Staten Island, N. Y.

Contrary to general medical opinion, alcohol does not dilate the coronary (heart) arteries, they conclude from electrocardiogram studies.

Ever since 1786, when the kind of heart trouble called angina pectoris was first described in medical reports, alcohol has been considered a valuable drug in its treatment, the doctors point out.

But it may actually be dangerous to the patient, even though an ounce or two of whisky or brandy often stops or prevents an attack of angina pectoris, Dr. Russek and associates state. The danger is that alcohol could prevent the warning pain without helping the heart.

The value of alcohol in this form of heart trouble has long been held due to a dilating effect on the blood vessels of the heart. Narrowing or closing of a coronary (heart) artery causes the agonizing pain of angina pectoris.

Most authorities on heart disease today consider alcohol as second only to the nitrites in value for dilating the heart's arteries and overcoming or preventing an attack of angina. And physicians often prescribe an ounce or two of whisky or brandy as a routine prophylactic measure for patients with angina, advising it especially before effort or excitement that is likely to bring on an attack.

"The view that a glass of whisky is the equivalent of a glyceryl trinitrate tablet for the patient with coronary (heart) disease should be rejected," Dr. Russek and associates declare.

They base this on electrocardiogram studies of patients at rest, after a standard exercise test without any drugs, and after the same test when given whisky, glyceryl trinitrate, and one-quarter grain of morphine before the test.

The whisky, they found, did not prevent the changes in the electrocardiograms brought on by the exercise test, but the gylceryl trinitrate either completely prevented or significantly modified these changes.

The whisky did prevent the pain and other sensations of angina, however.

Alcohol's effect in angina, they conclude, is due to its rapid action as a sedative. The tests with morphine bore this out. And while the sedative effect may be good for the patient having an attack of angina, it could be dangerous for a person to take whisky before undertaking vigorous physical effort.

The alcohol would not dilate his arteries, and would banish the danger signal of pain, thus perhaps putting him in the spot of undertaking more than his heart can stand. Sudden death or fatal seizure might be the result.

Science News Letter, June 3, 1950

ENGINEERING

Auto Tires Can Now Be Entirely Synthetic

➤ A SYNTHETIC rubber that can be used for the body of automobile tires without building up heat has been achieved.

This is the last major use of natural rubber from the Far East that has not been met by the new war-developed synthetics.

Dr. Carl Shipp Marvel, University of Illinois chemist, just awarded the Willard Gibbs medal of the American Chemical Society's Chicago section, made known the development of the new rubber in his laboratories.

Made from butadiene and styrene by a process employing sodium catalyst, the new rubber has the lowest heat buildup of any synthetic and is approximately equal to natural rubber in this property.

Synthetic rubber has proved satisfactory for use in both tire treads and inner tubes in practical use. Now natural rubber is considered necessary only in the tire carcass which use will be met by the new rubber.

Science News Letter, June 3, 1950

NUCLEAR PHYSICS

Sub-Atomic Particle Lives 60-Millionth of Second

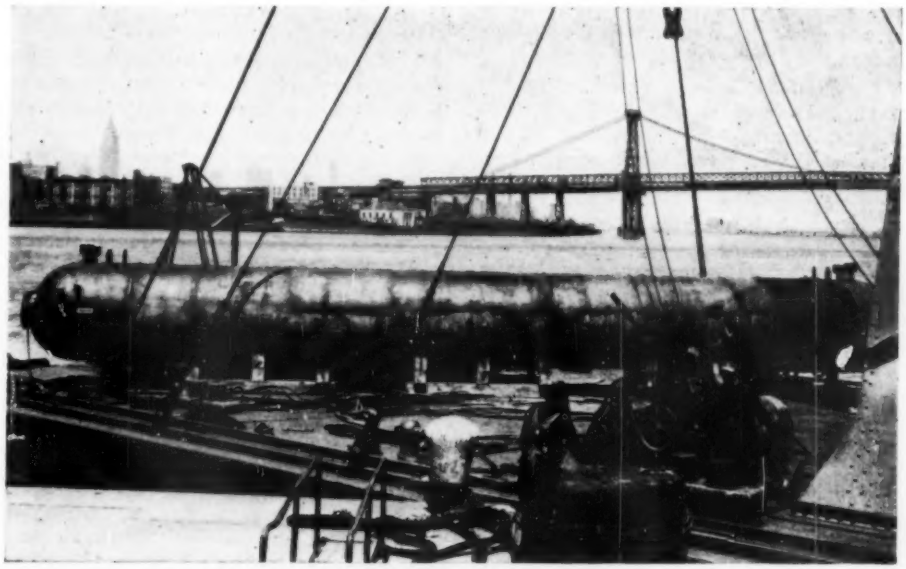
➤ LIFETIME of one of the fundamental particles within the atom is one 60-millionth of a second.

That is the short span of existence of the heavy positively charged meson, called the pi-meson, as determined with the new 300,000,000 electron-volt synchrotron of the Massachusetts Institute of Technology in Cambridge.

The exact function of these mesons in the nuclei or hearts of atoms is still mysterious. The high-energy atom smashers have allowed the artificial production of the particles first observed in cosmic ray collisions.

The M. I. T. scientists, Dr. William L. Kraushaar, Victor P. Henri, and Dr. J. Earle Thomas, Jr., used X-rays smashing into metal to produce the mesons and then detected their disintegrations as flashes of light in an organic crystal of stilbene.

Science News Letter, June 3, 1950



DRUM ON THE HUDSON—The 116-ton steam drum (66 feet long and six feet in diameter) for the world's largest boiler, arrives at New York Naval Shipyard by derrick lighter after a rail trip from Barberton, Ohio, prior to movement to Hudson Avenue, Brooklyn. Because of the drum's size and the possibility that the trailer might not be able to negotiate corners on narrow streets, several trial runs were made to select a route from the shipyard to the Hudson Avenue Station.

ENGINEERING

Need for Carbon Black

➤ IF war should ever come again, its supermechanization might put the U. S. in desperate need of the sootiest substance on earth—pure carbon black.

This fine, jet-black dust, made chiefly by burning natural gas, is so important to the tire industry that the National Security Resources Board has begun an extensive survey of the carbon black situation. Major questions: How much of it would this country need in event of an emergency? Could that much be manufactured?

Mixed with natural or synthetic rubber, carbon black strengthens and reinforces in a way still not clearly understood by scientists. Without this toughening ingredient, tires would have an average life of barely 5,000 miles. With it, since it was first added to rubber by Charles Goodyear about 1855, the life expectancy of automobile tires has been boosted to more than 30,000 miles.

Its role in supplying the tires on which warfare would be waged is vital. But carbon black has other important uses. It is the ingredient which makes printing inks black. Modern high-speed presses demand instantaneous imprints possible only with the use of colloidal carbon as the pigment. It is used in black and gray paints, carbon paper, typewriter ribbons, and many other industrial products. Activated carbon helps in the purification of water and sugar.

Carbon black producers, however, are facing stiffer and stiffer competition for their basic raw material, natural gas. Chemical industries and post-war pipe-lines to vast new household markets in the East are drawing away a great deal of the gas.

The National Security Resources Board's survey may result in a carbon black stockpiling program. A New York chemist and attorney, Harvey Titus, was named to head the study. His job will be to learn whether it is strategic and necessary for the U. S. to begin collecting large quantities of pure, powdery blackness.

Science News Letter, June 3, 1950

● RADIO

Saturday, June 10, 3:15-3:30 p. m. EDT

Adventures in Science, with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Cassius J. Van Slyke, Director, National Heart Institute, Bethesda, Md., will speak on "Have a Heart."

ENGINEERING

Rapid-Fire Sprays Help Test Alloys

➤ RAPID-FIRE salt sprays are helping industrial scientists solve the ticklish job of putting thin platings of chrome or copper over new light-weight aluminum alloys—and keeping them there.

A process being used by the Aluminum Company of America in its research laboratories is described by Fred Keller and Walter G. Zelley in the JOURNAL OF THE ELECTROCHEMICAL SOCIETY (April).

Test panels with various thicknesses of zinc undercoating, and cleaned initially by various acid baths, are electroplated. Then grooves are cut across them in the shape of an "X", and the panels are subjected to 300 hours or more of intense salt spray.

The results on the platings—sometimes peeling them off completely—can duplicate in the laboratory months or years of normal exposure to weather and household use.

Science News Letter, June 3, 1950

On This Week's Cover

➤ THE world's largest ponderosa pine, 229 feet high and 100 inches in diameter at breast height, was recently felled by the Blagen Lumber Company, White Pines, Calif. Two of the 13 logs from the 350-year-old tree are shown on this week's cover of SCIENCE NEWS LETTER. The logs totaled 38,160 bd. feet. Special sawing techniques were employed because of the logs' diameter.

Science News Letter, June 3, 1950

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Question Box

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MEDICINE

Artery Hardening Delayed

Diet promises to delay hardening of the arteries. The diet is effective in removing the particular cholesterol molecule which is associated with atherosclerosis.

➤ WAYS of delaying or slowing down through diet the progress of hardening of the arteries are very hopeful for the future. More progress in detecting this number one cause of human death and disability is also being made.

In a paper delivered in New York before the New York Academy of Medicine, Dr. John Gofman of the University of California's Donner Laboratory reported further confirmation of results first made known several weeks ago.

Dr. Gofman's report is cautious and he warns that further long-range results are essential even though results seem more and more promising.

The disease studied is atherosclerosis, which causes all but about three per cent of hardening of arteries. Cholesterol has been long condemned as the villain in atherosclerosis. However, this was not previously certain, since some individuals with high cholesterol in blood never get hardening of arteries.

Dr. Gofman has determined that there are at least four types of giant molecules in blood containing cholesterol. The presence of three types seems to be associated with atherosclerosis. The fourth type is not so associated. The presence of the fourth type may explain how some people can have lots of cholesterol in their blood without hardening of arteries.

Dr. Gofman reported that in 230 men with coronary heart trouble (atherosclerosis occurs in 95% of these cases) 91% had the defective molecules. The figure was 97% in women.

All of 30 cases of angina pectoris, four cases of nephritis, 16 cases of hypothyroidism, in all of which atherosclerosis is common, showed high concentrations of defective molecules. Almost all hypertensives and diabetics, similarly plagued by atherosclerosis, were also found with high concentrations of defective molecules in the blood.

The picture is sharply different with a large number of normal individuals tested, all of whom had lower concentrations. Defective molecules appeared in lower concentrations, however, among some apparently normal individuals.

The incidence and degree of concentration of the abnormal molecules corresponds to the incidence of atherosclerosis in the general population. For example, concentrations are almost non-existent in women under 40 but show a sharp increase over that age. The incidence and concentration increased with age in men up to 60.

Dr. Gofman reported low fat and cholesterol dietary studies in both normals and those with arterial disease. He found that the defective molecules should be diminished considerably or eliminated entirely in a large percentage of individuals by such measures. The rate of elimination varied. In some moderate cases, diet eliminated them in two to three weeks. In other cases, a rigid diet for four weeks was required. In an overwhelming majority of cases considerable reductions were achieved. Resuming their former diet brought a restoration of defective molecules.

Nineteen patients on restricted diet following coronary attacks for three months to three years were found to have lower concentrations than either diseased or normal individuals of corresponding age and sex groups, indicating the efficiency of the diet in removal of the defective molecules.

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AERONAUTICS

Extra Power from Engine

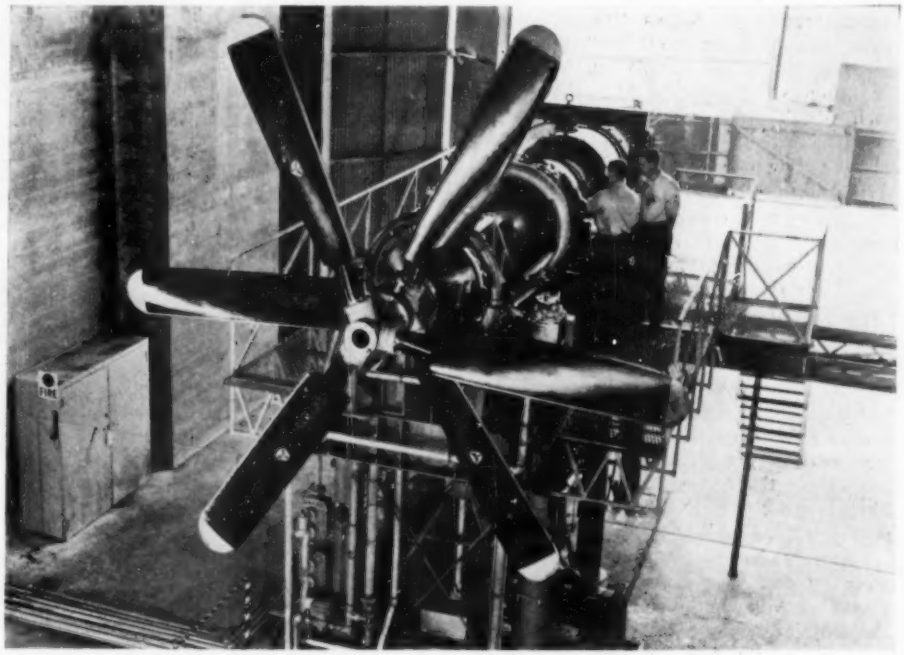
➤ A NEW powerful gas-turbine, propeller-type, airplane engine, a turbo-prop which has now completed shop-run tests and is ready for trial in the air, is featured by its ability to provide additional thrust by means of auxiliary jet power.

This new engine was developed for the U. S. Air Force by the Turbodyne Corporation, a subsidiary of Northrop Aircraft, Inc. It will be known as the XT-37 Turbodyne and is claimed to be the most powerful propeller-type engine in the world.

The engine has now successfully completed the official 50-hour endurance proving program, which means that it is fully qualified for preliminary flight tests. In tests it has actually delivered more than 10,000 horsepower in thrust, Northrop officials state.

During this endurance test it was incorporated in a complete power unit consisting of the engine, reduction gears, propeller and single-lever automatic electronic control system. It set a record by delivering 7,500 horsepower continuously over long intervals of time.

In general appearances, the new turbo-prop resembles the axial-flow type of turbo-jet engine. Turbo-prop engines are similar to turbo-jets except that the power developed is used to rotate a shaft which in turn rotates conventional propellers. This new en-



RECORD-SHATTERING—The XT-37 Turbodyne, the world's most powerful propeller-type aircraft engine, promises to extend ranges considerably over that now possible with pure jets.

gine is designed to provide high speed and long-range for very heavy military bombers and transports. Turbo-props, it is expected, will be widely used in the near future on most long-range commercial airliners.

Science News Letter, June 3, 1950

ZOOLOGY

Clue to Suicide Marches

➤ TINY insects may be the cause of the famed lemming suicide marches to the sea. Dr. Neal A. Weber, zoologist at Swarthmore College, has discovered that insects play an important role in the life cycle of the rodent-like creatures of the Arctic.

Every school boy has been told about the impetuous marches of the lemmings to drown themselves in the sea. These vast migrations, during which the number of lemmings actually increase by numerous births, occur at irregular intervals.

Studying lemming nests in Alaska, Dr. Weber discovered evidence that mites, flies and hard-shelled insects make their homes in the lemmings' nests. As the lemmings multiply, so do the insects. When the lemming population becomes too large to be supported on the vegetation of the area in which it lives, then multitudes begin to migrate. Dr. Weber studied the nests of lemmings known to zoologists as *Dicrostonyx rubricatus* and *Lemmus alascensis*.

Dr. Weber does not know exactly what effect these insects have on the growth of lemming populations. Mites, for instance, which carry diseases, might tend to inhibit population growth. But the hard-shelled insects might provide extra proteins for both the adult and the young lemmings, thus stimulating population growth.

The zoologist is going back to the Arctic regions of Alaska this summer to try to find out more about these furry members of the mouse family. Although the lemmings of Alaska do not take part in such vast or such extensive migrations as their cousins in Scandinavia, their living and breeding habits are similar.

Early stories about the European lemmings had it that they are not born here, but fall from the sky, and this legend still persists among some peasants in far northern Norway, Sweden and Finland. The story was first carried to Rome in 1522 by two archbishops from Trondheim in Norway.

The first dated suicide march of the five-inch long yellowish brown creatures was in 1579, when a mass of lemmings was seen near Bergen, Norway. The migrations are so vast that in 1868 a steamer entering Trondheim Fjord took a quarter hour to pass through a pack of swimming lemmings.

It was once believed that the lemmings were headed for the legendary "lost continent" of Atlantis, but some migrate toward the Arctic Ocean. Biologists believe that it is not where they are going that is important but only what they are going away from.

One book on the lemmings, by Charles Elton, says: "We begin to see this great biological spectacle that has aroused such wonder and curiosity among naturalists and has been given a tinge of epic romance by two English poets laureate (John Masefield and Robert Bridges) as a rather tragic procession of refugees, with all the obsessed behavior of the unwanted stranger in a populous land, going blindly on to various deaths."

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MEDICINE

Increased Protection from Vaccine Plus Vitamin

➤ GIVING the vitamin, folic acid, mixed with shots of vaccines will increase the disease protection given by the vaccine, Dr. P. A. Little, of the Lederle Laboratories, reported at the meeting of the Society of American Bacteriologists. This is because the vitamin is used by the body to build the protein material for antibodies, or germ-fighting substances, in the blood.

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GENERAL SCIENCE

Zebra Street Crossings Improve Driver Behavior

➤ "ZEBRA" crossings at street corners improve the way both pedestrians and drivers act, and this improvement is lasting.

Tests made at Britain's Road Research Laboratory had shown that of all the possible ways of marking road surfaces, the pattern most easily seen by drivers was one consisting of black and white stripes laid parallel to the curb.

These markings were then made on certain crossings in London and in some outlying towns. The movements of pedestrians and drivers were observed at 25 zebra crossings and at an equal number of crossings marked only by the usual studs and beacons.

Observations were made at the time of Pedestrian Crossing Week in order to compare the effect of the markings with that of propaganda. They were continued at intervals for six months after that time.

The number of people using the zebra crossing was counted and then expressed as a percentage of the total number of people crossing the street within 20 yards of the crosswalk. Driver-behavior was assessed as the proportion of drivers who voluntarily gave way to allow pedestrians to use the crossing.

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MOLDING SHOP—The molding shop where new plastics are tested on production equipment was a highlight in the public tour which the Stamford Research Laboratories of the American Cyanamid Company recently staged. The laboratory technique for the preparation of molded pieces using fiber-glass mat and polyester resins is shown above.

MEDICINE

Cancer in Heavy Smokers

The more heavily a person smokes, the greater are his chances of lung cancer although there are other factors involved.

➤ TWO studies showing a statistical relation between smoking and cancer of the lungs are reported in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (May 27).

"In general it appears that the less a person smokes, the less are the chances of cancer of the lung developing and, conversely, the more heavily a person smokes the greater are his chances of becoming affected with this disease," declare Ernest L. Wynder and Dr. Evarts A. Graham of Washington University School of Medicine and Barnes Hospital, St. Louis, in their report of 684 cases of proved cancer of the lungs.

"In a hospital population, cancer of the lung occurs more than twice as frequently among those who have smoked cigarets for 25 years than among other smokers or nonsmokers of comparable age. Pipe smokers apparently experience an almost equal increase in the incidence of lip cancer compared with other smokers or nonsmokers," Drs. Morton L. Levin, Hyman Goldstein and Paul R. Gerhardt of the New York State Department of Health state in reporting their study.

The New York study which started in 1938 was based on a history of tobacco usage obtained routinely from all patients admitted to the Roswell Park Memorial Institute, Buffalo. The histories were taken before final diagnosis was made. About half the patients were subsequently found not to have cancer.

Patients in the St. Louis study were in hospitals in various cities of the following states: California, Colorado, Illinois, Maryland, Massachusetts, Missouri, New Jersey, New York, Ohio, Pennsylvania, Utah and the District of Columbia. As a result, it was felt that this gave a good cross section of the entire United States.

Smoking cannot be the only factor in causing lung cancer, the St. Louis group points out, because the disease does not develop in every person who has been a heavy smoker for a long time and a small percentage of cases do occur in nonsmokers and minimal smokers.

The New York group also observes that "some other unidentified common factor" may play a part in lung cancer.

Almost all, 96.1%, of patients with lung cancer who had a history of smoking had smoked for over 20 years, the St. Louis group found.

Few women have smoked for such a length of time, they state, pointing out that this may be one of the reasons why there is more lung cancer among men today.

The heavy smoker who has given up smoking may yet develop lung cancer, it appears from results of the St. Louis study. This showed that there may be a lag period of 10 years or more between the stopping of tobacco smoking and the occurrence of cancer symptoms.

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ENTOMOLOGY

Electric "Fence" Tests Insecticides

➤ NEWEST wrinkle in testing insecticides in the laboratory: build an electric "fence" powered by alternating current around the potted plant on which the insecticide is sprayed.

Object of the barrier, devised by Drs. G. A. Wheatley and S. Z. Moczarski of the School of Agriculture in Cambridge, Eng., is to keep wingless insects from straying away from the plant being tested, yet retain control over atmospheric conditions. This is not possible when cages are used to confine the insects.

Direct current barriers have previously been used for this purpose, they state in the journal, NATURE (May 13,), but these sometimes kill the insects. Alternating current has a stimulating effect, making the insects "not loth to leave the points of contact." The new barrier gets rid of the risk of short circuits found with direct currents.

Science News Letter, June 3, 1950

PHYSICS

Solidification Point, Melting Point Not Same

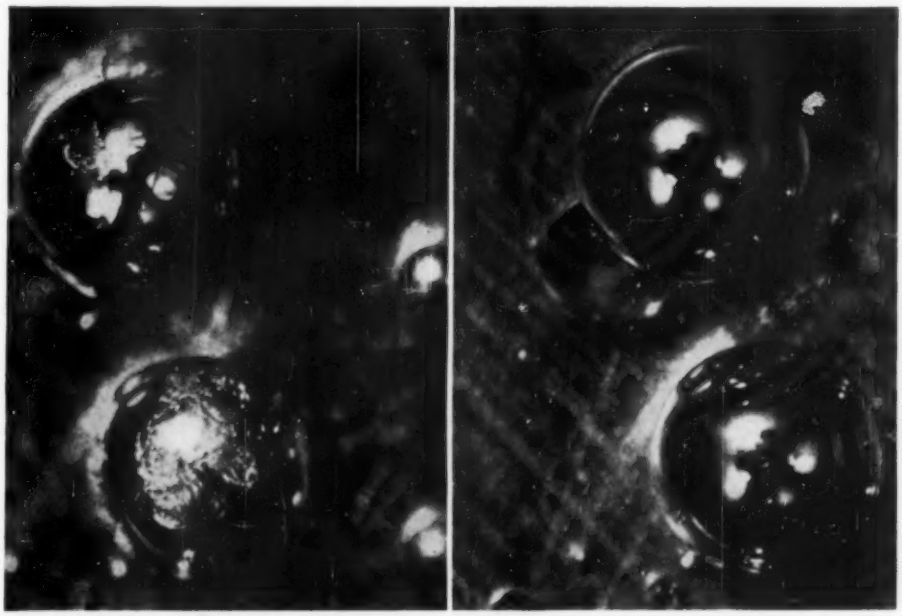
➤ THE melting point and the solidification point of a metal are not identical temperatures in spite of the fact that they are generally believed to be the same. This is the conclusion that General Electric scientists announced recently.

These scientists have been studying the behavior of metal droplets by means of special microscope equipment. They state that a molten pure metal solidifies at temperatures lower than the temperatures at which the metal melts.

Impurities in a metal cause solidification at a higher temperature than the solidification point of the metal in pure form, they said. The barest trace of impurities is enough to make molten metals "freeze" at temperatures above the solidification points for pure metals.

By means of a special attachment to a microscope, the scientists observed, through a quartz window, droplets of molten metal in a chamber. They were able to count the droplets solidifying as the chamber temperature was lowered. Certain of the droplets, free of impurities, were found to remain molten well below the supposed solidification point for the metal under study.

Science News Letter, June 3, 1950



DROPLETS OF GOLD—The droplets on the left, about eight thousandths of an inch in diameter, had been cooled far below their textbook solidification point without hardening. On the right are solidified gold drops which finally hardened after having remained molten, though 230 degrees Centigrade below the textbook solidification point for gold.

AERONAUTICS

Coastal Airport Is in Relatively Fog-Free Area

➤ FREEDOM from fog is forecast for Baltimore's new Friendship International Airport which will be dedicated and opened late in June this year. Located on a man-built plateau 140 feet above sea level, it is in an area where dense fogs occur during only five days in a year.

In spite of this, instrument landing equipment of the latest type is being installed. The instrument landing runway is unusual in length and width, which in itself is a safety factor. The runway is 9,450 feet long and 200 feet wide throughout.

Another safety factor is a zoning law which applies to the 32-square-mile area surrounding the airport. No building, power line or other structure taller than 280 feet above sea level may be erected within four miles of the runways.

The effect of this zoning is to provide a minimum of a so-called "fifty-to-one" approach, said to be the safest ever provided anywhere. This means a pilot may glide forward 50 feet for each one foot of descent. "Twenty-to-one" is regarded as satisfactory in other major seaboard landing fields.

This new airport is Baltimore's bid for international planes as well as for domestic traffic. It is located about half way between this city and Annapolis, and within an easy hour of automobile travel from Washington, D. C. It is expected to serve as an emergency field for the nation's capital when weather conditions make it necessary.

The new field is five times larger than the National Airport at Washington, and four times the size of LaGuardia Field of New York. Its cost was $15,000,000, of which Baltimore provided $12,000,000 and the Federal government the rest. Access roads are being built by the State of Maryland.

Science News Letter, June 3, 1950

GEOPHYSICS

Need Seasickness Remedy For Journey to Mars

➤ MOST of the future rocket journey to Mars is expected to be peaceful gliding in soundless space—but there's an area 30 to 50 miles above the earth where you had better have your seasick cup ready.

This is the conclusion of Dr. William Kellogg of the Institute of Geophysics, University of California at Los Angeles, who has just completed a study of the upper atmosphere.

The area is one of great turbulence where king-sized storms dwarf the most violent Atlantic hurricanes and Pacific typhoons and where winds sometimes reach velocities of an estimated 600 miles per hour.

This wild, windy region exists just above a layer in the upper atmosphere known as the ozone layer which absorbs a large amount of ultraviolet radiation from the sun and becomes super-heated. Just above is a considerably cooler layer. The rapid exchange of heat between the two layers probably accounts for the high turbulence, says Dr. Kellogg.

He bases his beliefs on four types of scientific evidence: (1) observation of meteor trails, (2) observation of noctilucent clouds in the area, (3) recordings carried by V-2 rockets, and (4) theoretical consideration of temperature changes.

It has been noted that meteor trails at the 30-to-50-mile altitude are sometimes torn apart. The thin, noctilucent clouds, which can be observed only at twilight, suddenly change shape and move rapidly. Research rockets have recorded up-drafts and down-drafts that approach the speed of sound.

One of these powerful up-drafts would be useful in giving a Mars-bound rocket a tremendous "boost" toward its destination. On the other hand, should the pilot encounter a down-draft, he would be bucking the world's biggest head wind.

Science News Letter, June 3, 1950

OPHTHALMOLOGY

Modern Drugs Reverse Old Age Eye Changes

➤ MODERN drugs can reverse certain old-age changes in the eyes and reduce the loss of sight, Dr. Francis W. Parker, Jr., of Rockford, Ill., reported at the meeting of the Illinois State Medical Society, at Springfield, Ill.

The drugs Dr. Parker reported as helpful are dicumarol, rutin and cevitamic acid. They act to relax and dilate blood vessels and aid circulation of blood through them, he explained.

The patients who could be helped by prompt diagnosis and early treatment with these drugs, he said, are those with hardening of the arteries in the retina. This is the tissue at the back of the eyeball which receives light impressions and acts like the film in a camera. The damage to these arteries causes loss of sight.

"Visual acuity," Dr. Parker said, "can be recovered and maintained in these patients."

Science News Letter, June 3, 1950

HOME ECONOMICS

Cook Beef With or Without Bone; Flavor Not Affected

➤ MANY people believe that beef cooked with the bone has a flavor superior to a similar cut boned before cooking. You can cook your beef either with or without the bone and the flavor is not affected.

This was reported by Drs. Pauline Paul, Mary L. Morr, Lyman Bratzler and Margaret A. Ohlson of Michigan State College, East Lansing, to the Institute of Food Technologists in Chicago. They made their study to find out whether locker space in freezers could be saved by storing beef after boning without sacrificing flavor in the cooked beef.

Science News Letter, June 3, 1950

IN SCIENCE

NUTRITION

Fatty Acids May Be Important to Health

➤ HAD your "fatty acid" pills today?

That's what you and I may be asking one another in the near future, according to Dr. James F. Mead and Arthur B. Decker of the Atomic Energy Project at the University of California at Los Angeles.

Recently completed studies by these two biochemists indicate that the little-known but essential fatty acids in the human body may play as important a role in maintaining good health as vitamins.

Experiments by Dr. Mead and Mr. Decker with young mice show that animals on a fatty acid-deficient diet never attain normal growth and manifest certain skin diseases like those resulting from a lack of vitamins. In addition, female mice become sterile and adults succumb quickly to radiation.

It is Dr. Mead's belief that human beings would react to a complete lack of fatty acids in the diet in the same manner as mice. Our present-day accent on high carbohydrate foods, he thinks, could produce symptoms similar to those observed in mice.

Because animals are unable to synthesize them, the essential fatty acids are obtained directly from vegetable foods—particularly corn, cereals and vegetable oils. Dr. Mead thinks that fatty acid pills could be produced fairly inexpensively from linseed oil.

Science News Letter, June 3, 1950

MEDICINE

Compound F, Cortisone Relative, Isolated

➤ A CLOSE relative of cortisone, famous wonder drug for arthritis and other ills, has now been isolated from the blood. Heretofore this chemical, known as compound F, had only been obtained from the adrenal glands themselves, which produce it.

Isolation of the compound from blood was reported by Drs. Don H. Nelson, Hans Reich and Leo T. Samuels of the University of Utah College of Medicine.

They got the compound in blood from the veins of the adrenal glands of dogs whose glands had been stimulated by doses of the pituitary gland hormone, ACTH. They did not find cortisone itself, or compound E. Both cortisone and compound F had originally been discovered in the glands by Dr. E. C. Kendall of the Mayo Clinic.

Details of the Utah research and a new method of analyzing the blood for hormones appear in the journal, SCIENCE (May 26).

Science News Letter, June 3, 1950

NCE FIELDS

PLANT PATHOLOGY

Fast-Spreading Fungus Attacking Gladiolus

➤ IN little less than three years, a new fungus disease attacking the U. S. gladiolus has spread from Florida north to New York State and west to Michigan.

The disease is called curvularia. It hits the stems, leaves and flowers of the gladiolus, leaving the mature plant covered with powdery black spore spots, or completely killing young gladiolus bulbs. Although similar to the widespread botrytis disease in its effect, curvularia likes hot, humid weather while botrytis thrives when it is cool and damp.

For home gardeners who have planted gladiolus bulbs this year, Drs. W. D. McClellan and N. W. Stuart, U. S. Department of Agriculture, tell what to do if the characteristic pinhead-size spots appear on the flowers.

A spray made of one ounce of the chemical parzate in three gallons of water will give satisfactory control, if applied when the spots are first observed and repeated at frequent intervals as long as the weather remains hot and humid.

Science News Letter, June 3, 1950

MEDICINE

Betatron Could Help 10% of Cancer Patients

➤ HELP for about 10% of patients with some kinds of cancers can be given by a 26,000,000-volt betatron such as that at the University of Illinois Research and Educational Hospitals in Chicago.

This figure on cures to be expected by the betatron comes from experience with the machine in treatment of 20 patients since last August when it first was put to clinical use. The results are reported by the American Cancer Society which helped finance accessory equipment for the machine.

One patient with cancer of the palate was able to eat after five weeks of treatment had shrunk his cancer, Dr. Roger A. Harvey, in charge of the betatron treatments, reported. Some lung cancer patients had decreasing cough and pain as treatment progressed. Elderly patients with bladder cancer showed some cancer destruction with little reaction in normal tissue.

In 90% of cases, the American Cancer Society stated, the betatron is "no more effective than standard X-ray equipment of 200,000 volts or less."

The beam from the betatron can penetrate a little deeper into the body than lower voltage machines and its rays are not scattered so much. It is, however, very expensive to operate, costing one dollar a minute exclusive of labor and other side expenses. The longest daily treatment lasts nine or 10 minutes. Only a few patients can be accommodated and there is now a long waiting list.

Science News Letter, June 3, 1950

CHEMISTRY

Spices for Seasoning Also Prevent Food Rancidity

➤ THE pepper, nutmeg or caraway with which you may season your food also serves another purpose: These and certain other spices prevent food's edible fats from turning rancid.

This discovery was made by Dr. J. S. Aggarwal and S. C. Sethi of the National Chemical Laboratory in Poona, India. Previously it has commonly been assumed that spices were added to foods, particularly in tropical countries, to cover up rancidity or decay.

They report that cumin, caraway, cinnamon leaf, nutmeg, cloves, pepper, fenol tumeric and red chillies are among the spices that will preserve fats, even under very severe oxidation tests.

Science News Letter, June 3, 1950

CHEMISTRY

New Non-Fattening Sugar Substitute Invented

➤ A NEW rival to saccharin as a sugar substitute avoids any bitter taste. It will sweeten without fattening and can be used in diabetic as well as reducing diets.

Sucaryl is the name given to it by its manufacturers, Abbott Laboratories. It has no bitter after-taste, which some persons complain about in saccharin, sugar substitute now widely used. And Sucaryl is stable so that it can be used in cooking, baking or canning without losing its sweetness. The heat of cooking decomposes saccharin, causing it to lose sweetness.

The new sweetening agent will be available in drug stores without prescription, but the manufacturer advises using no more than eight tablets per day. Patients suffering from severe kidney ailments are advised to take Sucaryl in moderate amounts and under a doctor's prescription.

An unexpected sweet taste on the cigarette a young chemist was smoking led to Sucaryl's discovery as a sugar substitute. The chemist is Dr. Michael Sveda, now a researcher at the Cleveland laboratory of Du Pont's Grasselli Chemicals Department. While working for his doctor's degree under Prof. L. F. Audrieth at the University of Illinois, Dr. Sveda discovered the sweet taste on his cigarette. It came, he found, from sodium cyclohexyl sulfamate, a new compound he had synthesized.

Science News Letter, June 3, 1950

FOOD TECHNOLOGY

Don't Kill Tired Hog; Give It Sugar and Rest First

➤ PORK from hogs that have been fed sugar and then allowed to rest 12 to 24 hours before being slaughtered lasts longer in storage than meat from hogs that are tired when killed. Studies supporting this were reported to the Institute of Food Technologists by Dr. N. E. Gibbons and Dyson Rose of the National Research Council of Canada.

They also found that the color of unsmoked bacon and ham remained red on cut surfaces long after similar meat from tired hogs had become brown and unattractive.

Science News Letter, June 3, 1950

NUTRITION

Rays Sterilize Fillets Without Amino Acid Loss

➤ FISH fillets were sterilized by radiation after being wrapped in plastic without any loss of nourishment so far as 10 protein-building amino acids are concerned. Tests showing this were reported by Drs. Bernard E. Proctor and Darshan S. Bhatia of Massachusetts Institute of Technology.

Haddock fillets, heat-sealed in polyethylene bags, were placed on a canvas belt moving at a certain rate under the cathode ray beam from a Van de Graaff generator to effect the sterilization. Ten amino acids were then determined in the irradiated fillets, and also in fillets that had not been irradiated. The method of sterilization did not result in a reduction of any of the amino acids tested, they reported to the Institute of Food Technologists in Chicago.

Science News Letter, June 3, 1950

PHYSICS

Atom Bomb Element Yields New Light-Weight Isotopes

➤ THREE new light-weight varieties of the transuranium element, neptunium, are announced by a University of California team of scientists to the American Physical Society through PHYSICAL REVIEW (May 15). The new isotopes have atomic weights of 231, 232 and 233 and they are made by smashing heavy hydrogen (deuterium) hearts into heavier atoms of uranium, the element 92 necessary to the atomic bomb.

Six other isotopes of this element number 93 in the periodic table were known previously. All of the new isotopes live only a matter of minutes, but there is one very long-lived variety of neptunium 237 discovered during atomic bomb research during the war. The new isotopes are believed to undergo fission.

The discoveries were made by Drs. L. B. Magnusson, S. G. Thompson and G. T. Seaborg.

Science News Letter, June 3, 1950

ENGINEERING

Television For All

The G-string will make possible a nation-wide television network, besides having other applications as in radar. It promises to supplement the coaxial cable.

By A. C. MONAHAN

➤ EVERY American home, because of a new carrier, may soon be within reach of television programs.

A new "G-string" single-wire system of transmission from station to station will permit an economical nation-wide network with local broadcasting centers to reach practically all of the country.

These local broadcasting centers will be, in effect, relay stations to receive programs by wire and put them out on the air. Stations are already doing this but they are receiving their programs over intricate, costly coaxial cable, the expense of which limits expansion.

May Replace Coaxial Cable

This new G-string system may replace coaxial, according to the present outlook. It will have many applications in addition to television. Important are those in connection with radar. It gives wide promises in telephony because many conversations can be transmitted over it at the same time.

Television range and radio range are quite different. Practically every home in the country can now receive radio programs. Those in many small-town and rural areas cannot get television. Ordinary radio waves have a tendency to follow the curvature of the earth. Television waves travel in straight lines and, because the earth's surface is curved, soon are too high in the air to be receivable on the surface.

Radio waves follow the curvature of the earth largely by bouncing back and forth between the surface of the land or water and atmospheric layers high above. The high frequency waves used in television, and also those used in FM (frequency modulation) radio, bounce back and forth to a lesser degree.

Both television (TV) and FM transmission are "line-of-sight" broadcasting. Their energy waves are ordinarily receivable only within the horizon. This means, in general, some 40 to 60 miles although they are sometimes picked up at distances twice as great. TV and FM stations on high towers have greater range, and a few that have been erected atop high isolated mountains have greater range still. The high frequency radio waves used in modern systems of communications with airplanes are receivable some 200 miles away if the plane is high in the air. In that case there are no land formations to cut the transmission path.

The ordinary single wire used for telephone or telegraph transmission can be used only for very short distances with television. The loss in transmission is too great. The intricate coaxial cable, developed primarily to carry a multitude of telephone conversations at the same time, is highly satisfactory for television.

Cable Is Costly

But coaxial cable is costly to construct and to install. The cost is warranted where telephone usage is high, but not yet for television. Its present use for TV is largely only during the periods of low telephone load.

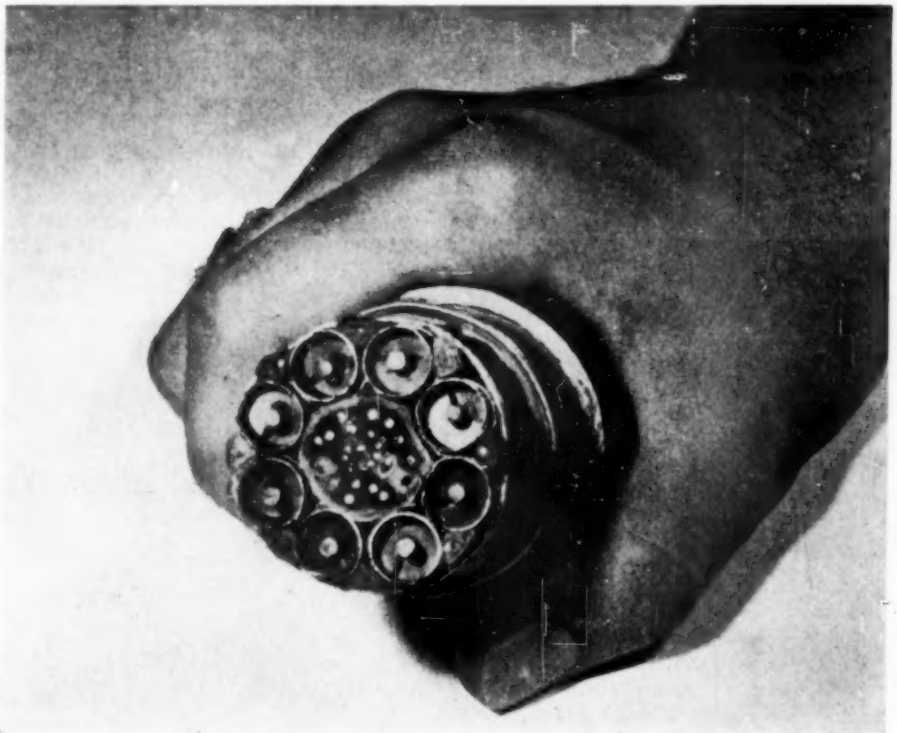
Ground-based relay stations are coming into wider use for television transmission. They are placed on high land some 40 miles apart. They pick up the TV signals and, after amplification, put them on the air again but beamed to the next relay in the system. In that way they keep the TV signals following the earth.

The new single-wire system for television transmission, dubbed the G-string after Dr. Georg Goubau, the inventor, was developed at the U. S. Army Signal Corps Laboratories, Fort Monmouth, N. J. It was first announced at a late winter meeting of the Institute of Radio Engineers in New York. It is a single wire with a special dielectric coating, and with funnel-shaped terminals.

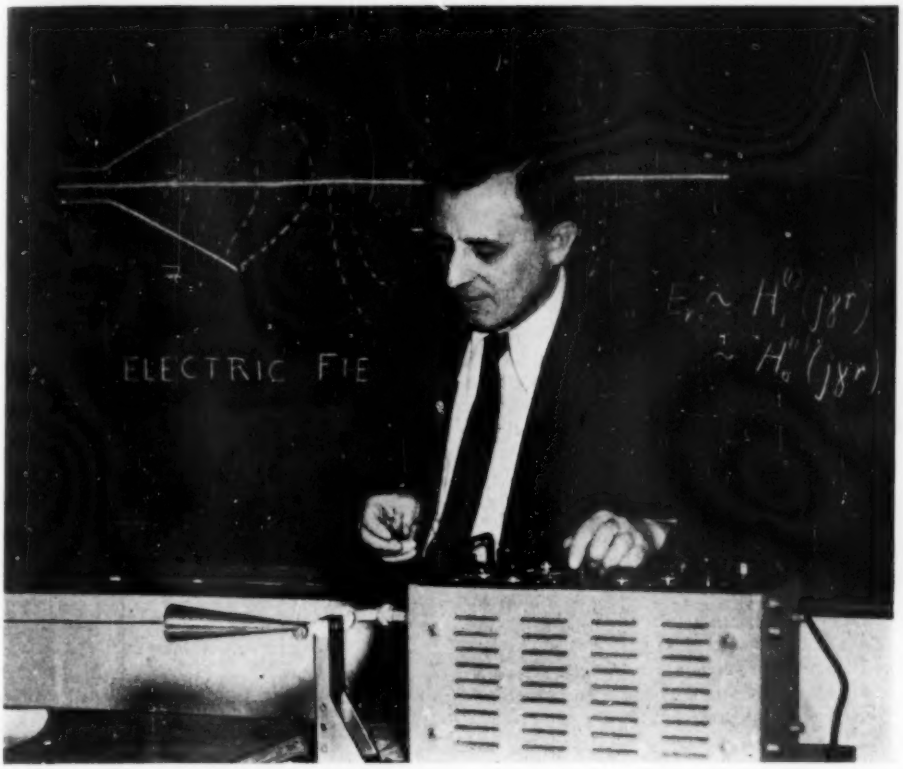
G-String Inventor

The inventor is a German scientist who was brought to this country since the war to assist in American work. He got his idea for his invention from a paper published in 1899 by Prof. A. Sommerfeld of the University of Munich. This paper had to do with wave propagation along a cylindrical wire. There was no thought at that time of TV transmission. In those days, television was probably not even a dream.

In Dr. Goubau's invention, the single-wire used is coated with a thin layer of a dielectric material, that is, non-conductive material. He used both an enamel and a coating of polystyrene. This layer results in a shrinkage in the cross-section of the electric field surrounding the wire, helping maintain its strength. The funnel-shaped terminal at the sending end helps keep concentrated the magnetic field lines which are in circles around the wire. The horn at the receiving



COAXIAL CABLE OF YESTERDAY—Comparable to the heavy, bungle-some skirts of yesteryear is the thick, intricate and expensive coaxial cable which has been used heretofore in television transmission and which may be outdated by the G-string.



G-STRING OF TOMORROW—Dr. Georg Goubau, of the Signal Corps engineering laboratory, is shown with the wire, the G-string, which promises to supplement the coaxial cable in bringing television to every American home.

end gathers in those within the area of its aperture.

Signal Corps officers have pointed out that, although this invention will be of civilian use, it will be of even more importance in the armed services, particularly in radar. It may make practical, they said, the development of a videophone. By this, two persons could hold a long-distance telephone conversation, "both parties seeing each other."

"The new Signal Corps line could carry a hundred such video-phone conversations simultaneously on a single wire," they stated, "compared with the ability of today's single coaxial cable to carry only one."

8,500 Channel Miles

Even without the G-string, the television network of the United States is rapidly expanding. Some 8,500 channel miles now inter-connect 25 cities having 50 television broadcasting stations, according to the American Telephone and Telegraph Company.

The overall coaxial network was extended over another 1,100 miles of route during the past year, bringing the total to 7,600 miles. Radio relay facilities were also completed over a half dozen or more short lines, and relay facilities are under construction by the company that will connect New York with Chicago, Des Moines and Omaha.

Coaxial cables now in use carry from one to four pairs of copper tubes, within each of which is a wire insulated from the tube by disks. Each are made to carry up to 600 telephone circuits. With three pairs in use, a cable can carry 1,800 simultaneous conversations.

Science News Letter, June 3, 1950

MEDICINE

Sailors' Health Menace: Dust from Moths' Wings

➤ A HEALTH menace to sailors is reported from Norway to the JOURNAL OF THE AMERICAN MEDICAL ASSSOCIATION (May 6).

Caripito itch is the name of it and it is caused by hairs from the wings and abdomens of moths belonging to the family *Saturniidae*, genus *Hylesia*.

The disease gets its name from Caripito, a harbor on the San Juan River in Venezuela. News of it reached Dr. J. Boe of the City Hospital of Bergen, Norway, when he received the following radiogram from the captain of a Norwegian 16,000-ton tanker in the Atlantic:

"If possible, telegraph medical advice for so-called Caripito itch. Cause: dust from the wings of moths. The whole crew attacked. The rash reminiscent of primula (primrose) flower. Violent itching. No fever. Have given remedies for itch, but result negative."

Dr. Boe had never heard of this condition and could find nothing about it in medical textbooks or from consulting skin specialists. He recommended ephedrine tablets and frequent washing with weak solution of ammonia. Two days later the captain reported that his patients were getting well.

Later the captain wrote that 41 of the crew of 44 had suffered Caripito itch. He said he had visited the harbor before without this mishap, but that the harbor master had warned him about it.

Dr. F. M. Urdaneta of Caripito reports that seamen on tankers coming from this port, which has been open since 1935, are subject to the complaint and that it is the hairs of the moth wings and abdomens which cause the trouble.

Science News Letter, June 3, 1950

ENGINEERING

Ceramals for Gas Turbines

➤ EARTHY substances combined with metals are the most promising alloys for use in the turbine engines of tomorrow's airplanes.

These new substances are called "ceramals" and they are used in the blades on the shafts of gas turbine engines where extreme high temperatures are encountered.

Much research into alloys and other materials needed to withstand the high temperatures within the gas turbine engine has been under way during the past decade, and particularly since the advent of the jet-propelled airplane.

A leading part in such work has been taken by the National Advisory Committee for Aeronautics. A review of NACA research on these ceramals has been issued by the Society of Automotive Engineers.

The report is by G. Mervin Ault and G. C. Deutsch, both of the Lewis Flight Propulsion Laboratory maintained by the NACA at Cleveland. It covers work done by them and others at this government institution whose primary concern is aircraft engines and fuels.

The high-temperature metal alloys now used in the blades on the shafts of turbines in both turbo-jet and turbo-prop engines are operating close to their upper temperature limits. Materials to withstand higher heat are necessary.

Ceramic blades show favorable strength at high temperatures, but they tend to fracture with sudden drastic temperature changes, a common occurrence in gas turbines. Ceramics also are brittle and difficult to handle without breakage.

The ceramals which were carefully investigated by the NACA included boron carbide ceramic to which iron was added, and titanium carbide which was used separately with cobalt, tungsten and molybdenum. The boron ceramic is one of the strongest; the titanium ceramic is the most resistant to shock.

The boron carbide-iron ceramal, 36% iron, has a strength consistently lower than that of pure boron carbide, but the rate of decrease in the ceramal's strength with increase in temperature is very low. At 2,400 degrees Fahrenheit, the ceramal lost only 27% of its room-temperature strength.

Titanium carbide ceramals containing cobalt were investigated extensively because cobalt was known to bond well with cemented-carbide tool compositions. Ceramals containing from 5% to 30% of the metal were used. The purpose of this was to determine the best mixture for the blading.

In bending tests, cobalt-bearing ceramals had exceptional strength up to 2,000 degrees Fahrenheit, but negligible strength at 2,400 degrees. The tungsten and molybdenum compositions, on the other hand, have only moderate strength at the lower temperatures but considerably surpassed the cobalt ceramal at 2,400 degrees.

A titanium carbide ceramal with 20% cobalt was found resistant to thermal shock. The cobalt-bearing bodies were found resistant to oxidation. From the tests, the scientists decided that the titanium carbide with 20% cobalt was the best to use in actual operation tests in an engine.

Science News Letter, June 3, 1950

GENERAL SCIENCE

Fear AEC Speech Controls May Extend Beyond H-bomb

➤ FEAR that attempts by the Atomic Energy Commission to control what scientists say about the hydrogen bomb will curb their willingness to discuss crucial political and military decisions was expressed in Chicago by Dr. Eugene Rabinowitch, editor of the BULLETIN OF THE ATOMIC SCIENTISTS (May).

Scientists in America should not become technical specialists working on topics without interest in the implication of their work for the future of the nation, Dr. Rabinowitch warned. They must have a feeling of obligation to take part in the formation of national policy.

"The initial success of totalitarian regimes in silencing all expression of independent opinion has been based only in part on actual reprisals or fear of reprisals," he said. "To a large extent it was founded on the unwillingness of most people to tangle with the police and censorship. It is simpler and safer to stick strictly to one's own business than to try to take part in public affairs if this participation is obviously frowned upon and surrounded by bothersome regulations."

"Scientists who have the most complete knowledge of the facts and the deepest understanding of the possibilities, have the right and the duty to participate. They alone are able to enlighten public opinion, and the judgment they have shown so far does not justify apprehension that they speak out too lightly or irresponsibly."

Science News Letter, June 3, 1950

Recorded only in the distortion-free *quality zone*, music "comes alive" on RCA Victor 45-rpm records.

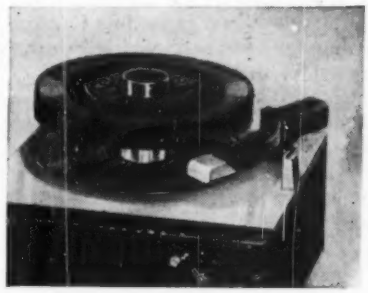
What **magic number** makes music mirror-clear?

Now, for more than a year, music-lovers have had—and acclaimed—RCA Victor's remarkable 45-rpm record-playing system. Already, millions know "45" as the magic number that makes music mirror-clear.

As was said when the American Society of Industrial Engineers presented RCA Victor with its 1950 Merit Award, "We are moved to admiration by your bold departure from past practices in developing a completely integrated record and record-player system."

Research leading to "45"—confirmed at RCA Laboratories—covered 11 years . . . and resulted in small, non-breakable records which can be stored by hundreds in ordinary bookshelves, yet play as long as conventional 12-inch records. The automatic player, fastest ever built, changes records in less than 3 seconds—plays up to 50 minutes of glorious music at the touch of a button! Every advantage of convenience and cost, marks "45" as the ideal system!

Another great RCA development is the finest long-play record (33⅓-rpm) on the market—for your enjoyment of symphonies, concertos, and full-length operas. Radio Corporation of America, Radio City, N. Y. 20.



Fully automatic RCA Victor 45-rpm record player and records—small enough to hold in one hand . . . inexpensive enough for any purse.

RADIO CORPORATION of AMERICA

World Leader in Radio—First in Television

ZOOLOGY

NATURE RAMBLINGS

Gopher

➤ ANY one who has ever dug a small hole in the ground should stand in awe of the earth-moving prowess of the pocket gopher. This little rodent, standing about half a hand high, weighing at the outside about a pound, and rarely exceeding a foot in length even with his long tail included, is a digging fool.

It has been estimated that in a good night's work in sandy soil a diligent gopher can dig a tunnel 300 feet long and one gopher high. This is all the more remarkable since the gopher, unlike the mole which compresses the earth by brute force as it worms its way through the ground, actually excavates the displaced earth by carrying it to the surface.

In other words, a foot-long gopher can dig a tunnel 300 times its own length overnight. A rough equivalent would be for a soldier to dig 300 slit trenches in one night, providing shelter from shrapnel for his entire company. To make the analogy valid, of course, the soldier would have to perform this feat without tools. And even so a ditch is easier to dig than a tunnel.

A gopher digs dog-fashion, loosening the dirt with its front feet and in the same motion throwing it backward underneath its body. It has heavy muscular shoulders and short powerful forearms, plus strong sharp claws which are very well suited to the job of digging.

After the gopher has loosened one load, it turns an agile somersault to face about in the opposite direction. Then, using a swimming motion not unlike the breaststroke, it pushes the load with its chest back up the tunnel to the surface.

Gophers are vegetarians. Their life is almost wholly subterranean, spent in tunneling through the earth in search of forage. Their food is made up of roots, bulbs and tubers. For this reason they are frequently a great nuisance to farmers and gardeners who find their feeding habits very destructive.

Pocket gophers get their name, not because they would fit into a pocket, but from a remarkable external cheek pouch where they store their food. These little pockets, one on each side, are fur-lined. As the gopher cuts off bits of food it stuffs them into the pockets. The animal works rapidly, using both paws somewhat like a small boy stuffing cookies into his pants pockets when no one is looking.

When the pockets are filled to the gopher's satisfaction, it scurries off through its elaborate tunnel to one or another of its storerooms. These are small galleries especially built for the pantry purpose. Here the gopher stores his groceries against future hunger. Then he goes back to work, digging and foraging.

Science News Letter, June 3, 1950

AERONAUTICS

Protection from Stunning Saves Lives in Crashes

➤ FEWER lives might be lost from fire in a crashed plane if passengers were not stunned by the crash shock, the National Fire Protection Association was told by Edward R. Dye of Cornell Aeronautical Laboratory.

Back-facing seats, securely anchored, with strong well-padded backs to support the entire spine and head, were suggested by him for passenger protection. Life safety from fire in aircraft accidents depends heavily on the ability of the passengers to evacuate the plane, he stated.

From reports covering commercial airplane crashes where survival has been limited, primarily from fire following a crash, he continued, many of the passengers had been subjected to such inertia induced shock that they could not help themselves from the wreck due to their dazed condition.

Another suggestion made by Mr. Dye to promote safety in case of a fire in a plane involves the location of all passengers aft of the wings. As stated by him, this would permit taking full advantage in a crash of the energy-absorbing characteristics of the airplane structure, and would also put the passengers in a position where the fuel will be thrown forward and away from them during the crash period.

Science News Letter, June 3, 1950

Brazil and Colombia supply about 80% of the *coffee* used in the United States.

DENTISTRY

Cattle Fungus May Play Part in Tooth Decay

➤ THE fungus which causes lumpy jaw disease in cattle may play an active part in tooth decay in humans.

This ray fungus, or a germ enough like it to be its twin brother, has been regularly found in advancing decay spots in tooth dentin, Drs. G. W. Burnett and H. W. Scherp of the University of Rochester School of Medicine and Dentistry reported at the meeting in Baltimore of the Society of American Bacteriologists.

Dentin is the part of the tooth between the enamel and the pulp.

When they put this organism with dentin in broth in test tube experiments, the dentin lost an average of 16% of its weight in three weeks. At the same time the organic matrix of the dentin became accessible to chemical changes and breakdown.

After the dentin had been exposed to the action of the fungus for 30 days, it had the characteristic dark-brown color often seen in the dentin of a decayed tooth. These same fungi removed parts of the protein of decalcified dentin though they did not disintegrate it.

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Books of the Week

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C. Ask for free publciation direct from issuing organizations.

ANALYTIC GROUP PSYCHOTHERAPY WITH CHILDREN, ADOLESCENTS, AND ADULTS—S. R. Slavson—*Columbia University Press*, 275 p., $3.50. An outline of the functions of the group therapist.

THE ANATOMY OF MATHEMATICS—R. B. Kershner and L. R. Wilcox—*Ronald*, 416 p., illus., $6.00. An advanced mathematical text introducing ideas and methods pervading modern mathematical research.

COUNSELING ADOLESCENTS—Shirley A. Hamrin and Blanche B. Paulson—*Science Research Associates*, 371 p., $3.50. A handbook presenting techniques for counseling teen-agers.

CROSS COUNTRY: Geography for Children—Paul R. Hanna and Clyde F. Kohn—*Scott, Foresman*, 160 p., illus., $2.20. A grade-school text for third or fourth graders.

ENCYCLOPAEDIA BRITANNICA WORLD ATLAS "TRADE EDITION": With Physical, Political and Global Maps, Geographical Comparisons, A Glossary of Geographical Terms, Political Divisions and Capitals and a Gazetteer Index—*Hammond*, 123 p., illus., $15.00.

THE ETHICAL BASIS OF MEDICAL PRACTICE—Willard L. Sperry—*Hoeber*, 185 p., $2.50. A theologian discusses the many problems of medical ethics.

FINANCING THE FARM BUSINESS—I. W. Duggan and Ralph U. Battles—*Wiley*, 354 p., illus., $4.00. Covers most of the important financial problems which confront young farmers.

THE FOUNDATIONS OF ARITHMETIC: A Logico-Mathematical Enquiry into the Concept of Number—G. Frege—*Philosophical Library*, 119 p., $4.75. German text included. Translated into English by J. L. Austin.

GENERAL BIOLOGY: For Colleges—Gairdner B. Moment—*Appleton-Century-Crofts*, 2nd ed., 680 p., illus., $5.00. An introductory text.

GENERAL CHEMISTRY—H. I. Schlesinger—*Longmans, Green*, 4th ed., 811 p., illus., $5.50. A college text brought up-to-date.

GENERAL CHEMISTRY—John Arrend Timm——*McGraw-Hill*, 2nd ed., 764 p., $4.50. A revised edition of an introductory college text.

GEOLOGY OF THE MACDOEL QUADRANGLE—Howel Williams—*State of California, Division of Mines*, Bull. 151, 78 p., illus., $1.75. A geological study beginning with rocks from the paleozoic age to the pleistocene epoch. Illustrative maps are included.

GEOLOGY OF THE QUIEN SABE QUADRANGLE CALIFORNIA—Carlton James Leith—*State of California, Division of Mines*, Bull. 147, 60 p., illus., $1.75. A study of the rocks from the Jurassic to the Pleistocene. There are six illustrative maps included.

GERMAN SCIENCE READER: An Analytical Approach to Translation Problems—George Wm. Radimersky—*Ronald*, 245 p., $3.00. For the student of scientific German.

HAMMOND'S COMPLETE WORLD ATLAS—*Hammond*, 376 p., illus., $5.00. All recent geographical changes are included.

HEATING-VENTILATING-AIR CONDITIONING GUIDE 1950: Vol. 28—W. N. Witheridge, Chairman—*American Society of Heating and Ventilating Engineers*, 1422 p., illus., $7.50. A standard reference book.

HOME ELECTRICAL REPAIRS—Alfred P. Morgan—*Crown*, 210 p., illus., $3.00. A practical guide on how to fix electrical equipment disorders in the home.

HOPI KACHINA DOLLS: With a Key to Their Identification—Harold S. Colton—*University of New Mexico*, 144 p., illus., $7.50. A description of what a kachina doll is, how it is made, and the principal features, such as masks and costumes; there are 250 types identified and each is illustrated with a simplified drawing.

THE HUMAN HEART—N. S. Haseltine—National Heart Institute, 22 p., illus., paper, free upon request to publisher, Heart Information Center, Bethesda 14, Md. A series of articles reprinted from the Washington Post on the heart and heart ailments. Also describes the campaign against heart diseases.

MAN'S PHYSICAL UNIVERSE: A Survey of Physical Science for Colleges—Arthur Talbot Bawden *Macmillan*, 3rd ed., 822 p., illus., $4.75. An introductory text for survey courses in physical science.

MARRIAGE AND FAMILY RELATIONSHIPS—Robert Geib Foster—*Macmillan*, rev. ed., 316 p., $2.75. Problems of courtship and marriage are discussed.

PHYSICS: A Textbook for Colleges—Oscar M. Stewart and Newell S. Gingrich—*Ginn*, 5th ed., 726 p., illus., $5.00. A revised introductory text.

SEX QUESTIONS AND ANSWERS: A Guide to Happy Marriage—Fred Brown and Rudolf T. Kempton—*Whittlesey*. 264 p., $2.95. Based on questions of men and women in the U. S. Army. Written in simple terminology.

THE SAFETY AND SPECIAL RADIO SERVICES—Federal Communications Commission—*Gov't Printing Office*, 37 p., paper, 15 cents. A pamphlet on the nonbroadcast radio services devoted to such fields as aviation, public safety, science and medicine.

SHELL COLLECTOR'S HANDBOOK—A. Hyatt Verrill—*Putnam*, 228 p., illus., $4.00. A guide for amateur shell collectors.

SIMPLIFIED CHEMISTRY EXPERIMENTS—Armand Joseph Courchaine—*Putnam*, 234 p., illus., paper, $2.80. An introductory lab manual to be used with any standard text covering the fundamentals of inorganic, organic and physiological chemistry.

SOCIAL PSYCHOLOGY: An Integrative Interpretation—S. Stansfeld Sargent—*Ronald*, 519 p., $4.50. An introductory text designed to acquaint students with basic facts, principles and applications in the field.

STREAMBANK EROSION CONTROL ON THE WINOOSKI RIVER, VERMONT—Frank C. Edminster, Walter S. Atkinson and Arthur C. McIntyre—*Gov't Printing Office*, U. S. Dept. of Ag. Circ. No. 837, 54 p., illus., paper, 20 cents. The case history of streambank erosion control and flood-plain protection on the Winooski River, Vermont.

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AERONAUTICS

Tiny Magnetic Compass Ready for Emergency Use

➤ A NEW, tiny emergency compass for airplanes has been installed on British Naval planes.

This new magnetic compass was developed by the Admiralty Compass Observatory and is for use if the remote indicating compass fails. Tests already made show it to be stable in flight.

The compass weighs slightly over three ounces and it is enclosed in a small cube. Built-in horizontal and vertical correctors are provided. The bowl is constructed of a transparent plastic material. The damping liquid is a silicone fluid of high chemical inertness. Metal bellows fitted in the bowl allow for expansion and contraction over a wide temperature range.

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• New Machines and Gadgets •

For addresses where you can get more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 519. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

⚙ *AUTOMOBILE POLISH, which is a four per cent silicones solution, cleans fast and easily and gives the car a glass-hard surface that keeps moisture and heat from penetrating the paint, it is claimed. Silicones are relatively new chemicals made from sand and organic materials.*

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⚙ *COMPLETE KIT to make a home-built Geiger counter, to detect the mineral uranium needed in atomic energy developments, contains all necessary tubes, batteries, resistors, headsets and other parts. It contains also a metal case for the counter and complete directions for assembling.*

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⚙ *PLASTIC WINDOWS with frames can be quickly inserted into fabric coverings used to store army equipment and protect the contents from damage by moisture. These miniature portholes, an Army invention, permit easy inspection of contents. They unscrew if replacement of the water-absorbing materials employed is necessary.*

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⚙ *TINY SCREWS, threaded and slotted and small enough to almost pass through the eye of a needle, as shown in the picture,*

are said to be the world's smallest mass-produced precision screws. They are used in precision watches and several types of military timing instruments.

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⚙ *BUBBLE LEVEL, attachable to any hand-held portable electric or pneumatic drilling machine by two screws, makes it easy to drill a perfectly straight vertical hole through a floor or a horizontal hole through a wall. Operators watch the level, not the drill, to keep from making a wobbly hole.*

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⚙ *DRINKING GLASS HOLDER, for outdoor use, is a pointed rod, some two foot in length, to stick in the earth, the top end of which is formed into a coil into which the glass fits. The rigid rod is of steel with a plastic coating in color to provide decoration and protection from rust.*

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⚙ *MAGNET DEVICE, to remove iron pieces from acid baths, alkali baths and electroplating tanks in industrial plants, is a permanent magnetic stainless-steel tube mounted between tiny wheels. It is easily rolled, like a carpet sweeper, over the bottom of the tank.*

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⚙ *TRUCK LABORATORY, used by Pennsylvania's Bureau of Industrial Hygiene, can be rushed to areas suffering from air pollution to determine the particular gases or fumes causing the condition. It carries 25 scientific devices for air sampling and chemical analysis.*

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Do You Know?

Many *sharks,* unlike most fish, give birth to living young.

Most *stutterers,* unable to talk except with difficulty, can sing with ease.

Norway's *merchant fleet* is now 6% of the world fleet; it was 7.1% of the world's prewar fleet.

Women live longer than men practically everywhere in the world except India.

Carboxymethyl cellulose, added to rinse water each time that cotton goods are washed, makes the fabric more resistant to soiling and easier to wash.

Fluorescent street *lights,* which will provide uniform brightness with a minimum of glare, are now increasingly being installed on city streets and heavy traffic roads.

Marks in snow on the ice of a Yellowstone Park lake, made by a pair of trumpeter *swans,* showed that the birds landed in parallel 12 feet apart and that each skidded 25 feet to a stop.